REMARKS

The claimed subject matter has been amended to more particularly point out and distinctly claim Applicants' invention under 35 U.S.C. § 112. The drawings of Figure 2 now includes an arrowhead to show that raw output data signals are sent to the primary microprocessor for evaluation and processing, and designations "A" and "B" are placed to conform the drawing of Figure 7 to the written description. See the last full sentence at page 12 and the first full sentence at page 13 of Applicants' written description.

Withdrawn claims 7-13 and 17 are currently amended to reflect limitations of systems set forth in amended claims 1 and 14. Applicants request reinstatement of these claims be considered in light of the amendments to the rejected claims that show the Rundo and Harris references cited and applied in the rejection of these claims do not disclose the problem of distinguishing between the presence of an operator's hand and foreign material in an operator-sensing circuit.

Moreover, claims 7 and 17, like amended claims 1 and 14, include both a charge-transfer sensor that is not self-calibrating and does no processing of the discharge output signals of the hand-sensing electrode means but sends raw output data output signals to microcontroller means that evaluates and processes them to determine that the motor of the unit of power equipment is to be stopped. Neither Rundo or Harris teaches the use of microcontroller means in a calibrated operator-sensing system to perform the functions recited in amended claims 1 and 14.

Amended claim 14 is directed to a method of sensing the presence of an operator's hand on a gripping surface of a power equipment unit by providing an electrode electrically coupled to microcontroller means separate from a charge-transfer sensor electrically connected to the microcontroller means for performing the recited functions in amended claims 14-16.

Applicants' Invention

Applicants' invention of amended claim 1 overcomes the problem recognized by Applicants of distinguishing between the presence of an operator's hand and foreign material on the gripping surface for avoiding a false hands-on signal in an operator-sensing circuit. The invention is directed to a calibrated operator-sensing circuit having microcontroller means that commands a charge-transfer sensor to send a sensor charge signal to capacitive sensing electrode means. The sensor receives a discharge signal from the electrode means and outputs a corresponding raw data signal to the microcontroller means that, in turn, sends a signal that disables the motor of a unit of power equipment upon the absence of an operator's hand on a hand-gripping surface of the equipment. The capacitive operator-hand sensing electrode means of the invention operates within a predetermined output capacitor discharge range that includes preselected binary digit values that designate hands-off and hands-on conditions on the hand-gripping surface.

The capacitor discharge range of the calibrated operator-sensing circuit overcomes the target problem by distinguishing between the presence of an operator's hand and foreign material on the gripping surface for avoiding a false hands-on signal. The operator-hand sensing electrode means includes an inner dielectric material layer contiguously disposed on a metal handle portion of the power equipment, a metal sheet foil conductor material layer contiguously disposed on the dielectric material, and an outer dielectric hand-grip material having a hand-gripping surface.

Claim 2, rewritten in independent form, is directed to a feature of the invention comprising hand-sensing electrode means including a metal sheet foil tubular configuration having two opposed end edges with an outer hand-gripping surface that overlaps the end edges and enables the system to distinguish between the presence of an operator's hand and foreign material on the gripping surface

for avoiding a false hands-on signal. The claim conforms to the language of original claim 2 dependent from original claim 1, incorporating its limitations, and further includes the limitation that "a hand-sensing electrode [has] an inner dielectric material layer contiguously disposed on a metal handle portion of the power equipment, a metal sheet foil conductor material layer [is] contiguously wrapped around the dielectric material to form a tubular configuration having two opposed end edges, and an outer dielectric hand-grip material including said hand-gripping surface that overlaps said opposed end edges thereby producing a capacitance in a grasping operator's hand, an outer hand-grip material, and the metal sheet foil conductor material layer."

Amended claim 14 is directed to a method of sensing the presence of an operator's hand on a gripping surface of a power equipment unit by providing an electrode electrically coupled to microcontroller means separate from a charge-transfer sensor electrically connected to the microcontroller means for performing the recited functions of amended claims 14-16.

The Rejections

Claims 1, 2, 6, and 14-16 are rejected under 35 U.S.C. § 102 as being anticipated by Rundo (U.S. Patent 6,501,281 B1) ('281), and claims 3-5 under 35 U.S.C. § 103 are rejected as being unpatentable over Rundo '281 in view of Harris (U.S. Patent 2,725,548 A) ('548).

Argument

35 U.S.C. § 102 Rejection of Claims 1,2, 6, and 14-16: Applicants' rewritten claim 1, directed to an operator-sensing circuit in a calibrated operator sensing system, comprises microcontroller means electrically connected for sending commands to a charge-transfer sensor electrically connected for sending sensor charge signals to capacitive means and receiving raw output discharge data signals therefrom. Upon command by the microcontroller means, the charge-transfer sensor sends a

sensor charge signal to the capacitive means having a capacitive hand-sensing electrode disposed on a hand-gripping surface of a unit of power equipment. In response, the charge-transfer sensor receives a discharge output signal from the hand-sensing electrode, and sends a raw discharge output signal to the microcontroller means electrically connected for disabling the motor of a unit of power equipment upon the absence of an operator's hand on a hand-gripping surface of the equipment.

In applying Rundo '281 to claim 14, the examiner states that it discloses "a charge-transfer sensor (130) electrically coupled to the sensing electrode (120a, 120b)" and "microcontroller (QT 110) (Fig. 5) means electrically coupled to the charge-transfer sensor for periodically commanding the sensor to transfer charge to the sensing electrode (120a, 120b)." ***Rundo's charge-sensor "130" and microcontroller means "QT 110" are one and the same device, and his sensor 130 is self-calibrating so that Rundo does not disclose a calibrated operator-sensing system.***

The '281 patent does not disclose a charge-transfer sensor electrically coupled to microcontroller means for performing the stated functions of the claims so the limitations of amended claims 1 and 14 are not disclosed, taught, or suggested by Rundo '281. Consequently, Rundo '281 does not anticipate the limitations of amended claims 1, 6, and 14-16 so the rejection under 35 U.S.C. § 102 does not apply to claims that specify "a calibrated operator-hand sensing circuit" having a charge-transfer sensor electrically connected to separate microcontroller means for performing the recited functions.

Regarding amended claim 2 that incorporates a metal sheet foil tubular configuration having two opposed end edges, an outer hand-gripping surface overlaps the end edges and enables the system to distinguish between the presence of an operator's hand and foreign material on the gripping surface for avoiding a false hands-on signal. The examiner states that the "22 gauge copper

bus wire" and "cylindrical shaped mesh or grid" disclosed by Rundo '281 anticipates the language of claim 2. Applicants explain in their written description, at page 13, lines 15 to 21, the difference between their electrode structure and electrode capacitance, and Rundo's electrode structural configuration and electrode capacitance.

> If for example, the diameter of the grip is about 20 to about 30 millimeters, the circumference at one end edge [of the metal foil tube] is about 60 to 90 millimeters so with two edges at opposed ends of the tube the approximate edge length is about 120 to 180 millimeters. Thus the metal foil tube is less likely to be affected by water and dirt on the gripping surface. On the other hand, with about 2000 millimeters length of edge such as may be available in a wire coil or net-shaped metal coil used on the [Rundo '281] electrode, the electrode capacitance is more likely to be more greatly increased to approach a false hands-on signal when water and dirt of a mixture thereof is on the hand-gripping surface.

Thus, Rundo's wire coil electrode presents a completely different electrode structure than Applicants' electrode structure, performs differently from Applicants' electrode, and requires "minor adjustments" to the self-calibrating QT 110 charge-transfer sensor that is ***not*** electrically coupled to microcontroller means that are nonexistent in the '281 circuit, contrary to the examiner's contention concerning Applicants' claim 14 discussed above.

Regarding the examiner's reference to column 5, lines 19-23, Rundo discusses these "minor adjustments" to his sensor 130 to be " well known to those skilled in the art" and "are required to support different numbers, size and configurations of sensing electrodes and provide acceptable threshold level and sensitivity values for the circuit 100." Rundo states:

> Sensitivity refers to the magnitude of the gain of the sensor 130 while threshold level refers to the percent of absolute signal level at which the sensor changes output state. Sensitivity is related to sensing electrode surface area, orientation with respect to the object being sensed, sensed object composition, and the ground coupling quality of both the sensor circuit and the sensed object.

The sensitivity values for the '281 circuit 100 refer to the "magnitude of the gain of the sensor 130"

that are related to the "sensed object composition" being sensed. Rundo does not mention water, dirt, or mud but only mentions the "hand" of the operator as the sensed object. So the "sensed object composition" to which the "sensitivity" relates is that of an operator's hand and what is on the hand, if anything. The '281 patent is not concerned with foreign material such as water, dirt, or mud on its hand-gripping surface with its metal coil electrode that Applicants show is "more likely to be more greatly increased to approach a false hands-on signal when water and dirt or a mixture thereof is on the hand-gripping surface" (Applicants' written description at page 13, lines 18 through 21).

So the examiner's conjecture that the '281 circuit 100 with the QT 110 sensor "is able to distinguish between the presence of an operator's hand and foreign material based on sensing object composition," is baseless and finds no support in the '281 disclosure. This fact regarding Rundo's sensor 130 is one of the reasons that Applicants developed its tubular configuration for its sensing electrode, and uses a charge-transfer sensor electrically connected to microcontroller means in their claimed calibrated operator-sensing circuit of amended claims 1, 6, and 14-16.

Moreover, the examiner's conjecture proves that the '281 patent does not anticipate Applicants' invention because they show that such a distinction between "the operator's hand and foreign material" does not exist in Rundo. Thus, Rundo does not fully meet Applicants' claim limitations so the rejection under 35 U.S.C. § 102 does not apply to amended claims 1, 6, and 14.

Regarding Applicants' claims 15 and 16, the examiner states that the '281 patent shuts off the "grounding magneto in internal combustion engine or by interrupting the supply of power to an electric motor." However, the '281 patent does not disclose how that is done. For Rondo does not disclose "microcontroller means electrically coupled to said component system" for causing its cessation of operation "when the microcontroller means determines that the raw data output signal"

of Applicants' charge-transfer sensor "indicates that the quantity of charge is not within the true hands-on section of said capacitor discharge range." So the '281 patent does not fully meet the combination of Applicants' claims 15 and 16. Thus, the rejection under 35 U.S.C. § 102 does not apply to claims 15 and16 that depend from amended claim 14.

35 U.S.C. § 103 Rejection of Claims 2-5: Regarding the currently amended claims 2-5, the examiner states that "Rundo discloses all of the claimed limitations as set forth" in the claims. But Applicants have shown above that this is untrue of the amended claims. Yet the examiner concludes that it "would have been obvious for one of ordinary skill in the art to modify Rundo by adding a metal foil layer disclosed by Harris for forming an electrode of a capacitance sensor and having a specified thickness of about 0.10 mm to about 0.15 mm and having the structural configuration of a tube having a longitudinal axis that extends along a delimited length of an inner dielectric material tube so as to form a tubular electrode instead of the spiral wire type electrode."

Harris does not relate to the operator-hand sensing field for disabling engines of mobile power equipment. So the question is what in either of the references would lead one having ordinary skill in the art to combine the teaching of the references to render Applicants' claims unpatentable.

NON-ANALOGOUS PRIOR ART:

The examiner must determine that Harris is "analogous prior art" for the purpose of analyzing the obviousness of the subject matter at issue. To rely on a reference as a basis for rejection of an invention, the reference must either be in the field of Applicants' endeavor (the operator-hand sensing field) or, if not, then be reasonably pertinent to the particular problem of distinguishing between an operator's hand and foreign material (a unique problem in the operator-hand sensing field) addressed by Applicants. *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445

(Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992) ("A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem."); *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993)>; and *State Contracting & Eng'g Corp. v. Condotte America, Inc.*, 346 F.3d 1057, 1069, 68 USPQ2d 1481, 1490 (Fed. Cir. 2003) (where the general scope of a reference is outside the pertinent field of endeavor, the reference may be considered analogous art if subject matter disclosed therein is relevant to the particular problem with which the inventor is involved). The Harris variable-capacitor transducer is used in a geophysical prospecting application that is not analogous to the Rundo operator-sensing circuit used in the operator-hand sensing field for disabling engines of mobile power equipment upon absence of the operator's hand.

Non-analogous Prior Art References

Rundo does not recognize the problem associated with his self-calibrating charge-transfer sensor so he makes no attempt to solve one. His hand-sensing electrode located on the handle(s) of the disclosed power equipment is not pressure sensitive but produces an electrically measurable capacitance simply when an operator's hand is present and another measurable capacitance when it is not present. Rondo does not disclose a microcontroller means for evaluating and processing raw output data signals from his charge-transfer sensor to shut down the motor of the power equipment when the operator's hand is absent from its hand-gripping surface.

The Harris transducer is outside the pertinent field of endeavor of Rundo and Applicants' invention. So the references may be considered analogous art only if subject matter disclosed

therein is relevant to the particular problem with which the inventor is involved. Applicants' invention addresses a problem not recognized by Rundo. Harris addresses a transducer means associated with electric circuitry for the detection of relatively low-frequency pressure variations and is useful in geophysical prospecting applications. Harris in not concerned with measuring changing capacitance of an electrode when the presence or absence of an operator's hand is causing the changing capacitance of the electrode. Harris is clearly outside the pertinent field of endeavor of Rundo and cannot be combined to reject claims 2-5 under 35 U.S.C. 103.

Rundo is associated with the art of operator sensing for disabling engines of hand-operated power equipment. Rundo does not recognize the problem of distinguishing between an operator's hand and foreign material of the exterior environment on a hand-gripping surface, nor does Rundo recognize the problem associated with a self-calibrating charge-transfer sensor that does not use microcontroller means electrically connected to it.

Figure 4 of Harris discloses a geophone built around a cylindrical capacitative unit built around a pressure-responsive dielectric material. The transducer includes two cylindrical electrodes each cemented to opposed sides of an annular dielectric core. The inner cylindrical electrode of the transducer is disposed around an interior elastic medium "for transforming axially directed pressure variations into radial deformations and, therefore, into tangential strains in the dielectric material" of the transducer. In other words, the inner surfaces of the two cylindrical electrodes are subject to the distortion or elastic deformations of the interior elastic medium. Nothing relates to exterior environmental conditions as in the present hand-gripping surface on the handle of power equipment.

One end of a piston sits on the surface of the earth and the other top end of the piston contacts a bottom end of the elastic medium. A cylindrical counterweight rests on the opposed upper end of

the elastic medium and forms an annular space around the outer surface of the outer cylindrical electrode. Earth-transmitted shocks appear as longitudinal thrusts on the piston and work against the inertia of the counterweight. This action causes "radial deformations of the elastic material 54 and of the cylindrical [dielectric] core" against the space formed by annular air filled pockets disposed around the transducer.

In short, Harris requires two cylindrical electrode sandwiched around a pressure-responsive dielectric material where the outer electrode is free of a hand-gripping material or any exterior environment to affect the capacitance of the transducer. Nothing in Harris would lead one having ordinary skill in the art to conclude that Harris is analogous to the hand-sensing electrode of Rundo.

Combining References

To establish prima facie obviousness, the cited prior art must suggest the desirability of the combination of the Rundo and Harris references. As shown, no suggestion of desirability to combine the references exists, and the § 103 rejection merely combines and modifies the references to fit Applicants' claims after the examiner has gleaned knowledge of Applicant's claimed invention. That is, in any rejection of claims over a combination of references, the examiner must show some teaching that the references must include some reason to combine the references, other than the applicants' disclosure in their own application.

There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet,* 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.) The

level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

In the instant case, the references on which the examiner relies do not teach the problem solved in the operator-hand sensing circuit art and the secondary reference does not teach the use of a single tubular sheet metal foil or the combination of a charge-transfer sensor with microcontroller means to effect the results set forth in the amended claims. Clearly the references do not teach every element being claimed, and no reason exists for the combination of references. Without motivation to combine the cited references, a rejection based on a *prima facie* case of obvious is improper.

In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *In re Kotzab,* 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Lee,* 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002) (discussing the importance of relying on objective evidence and making specific factual findings with respect to the motivation to combine references); *In re*

Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

No Obviousness in Combination of References

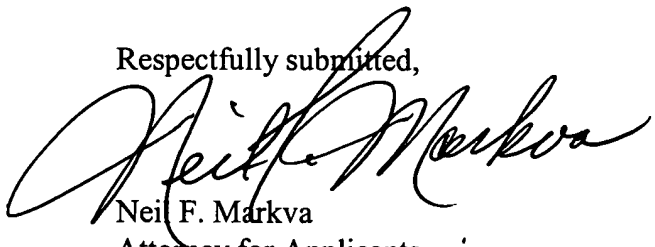
As shown, no such teaching, suggestion, or motivation is found either explicitly or implicitly in the Rundo and Harris references themselves or in the knowledge generally available to one of ordinary skill in the art. Moreover, the combination of references does not teach every element of Applicant's invention.

The examiner has not shown any teaching in the references that discloses a reason to combine the references, other than Applicants' disclosure in their own application. Without a motivation to combine the cited references, and even if some reason were found, the combined teachings of the references would not have suggested to one of ordinary skill in the art to use a tubular configuration of metal sheet foil in the place of Rundo's wire coil. Therefore, a rejection based on a *prima facie* case of obviousness is improper.

Conclusion

In view of the foregoing, the rejections under 35 U.S.C. §§ 102 and 103 are shown to be without merit. So allowance of claims 1-6 and 14-16 is respectfully requested. Reinstatement and allowance of claims 7-13 and 17 are also respectfully requested for Applicants' same arguments apply to their claimed limitations with respect to the Rundo and Harris references.

Respectfully submitted,



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ANNOTATED SHEET

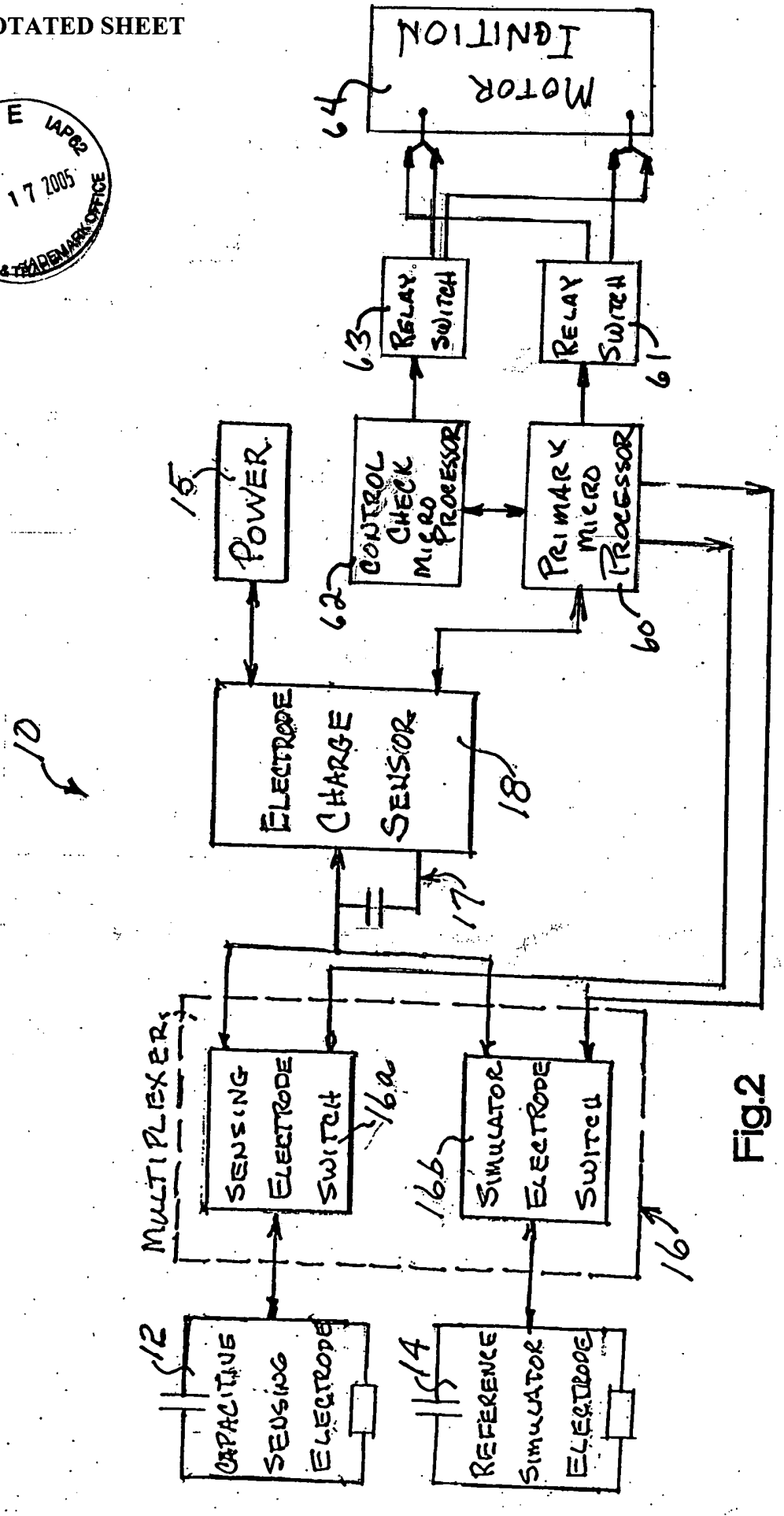

Fig.2

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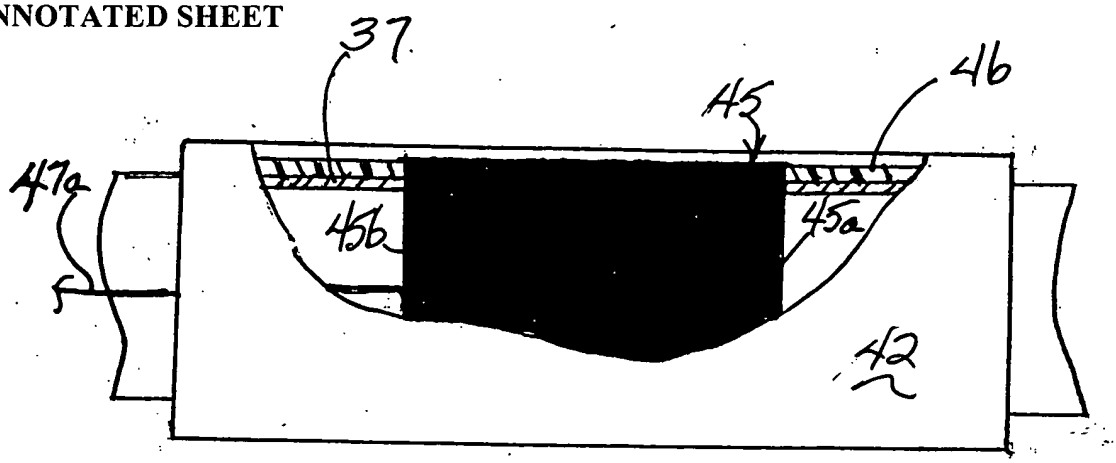

Fig.5

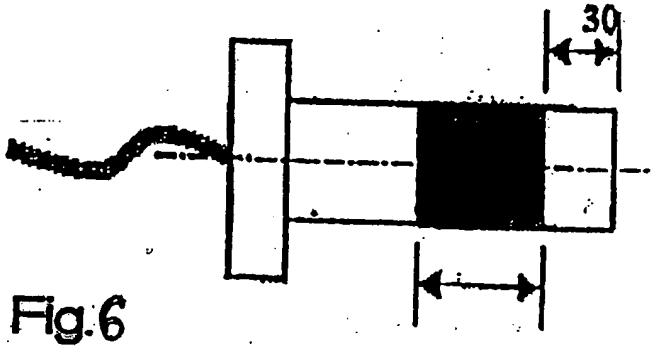

Fig.6

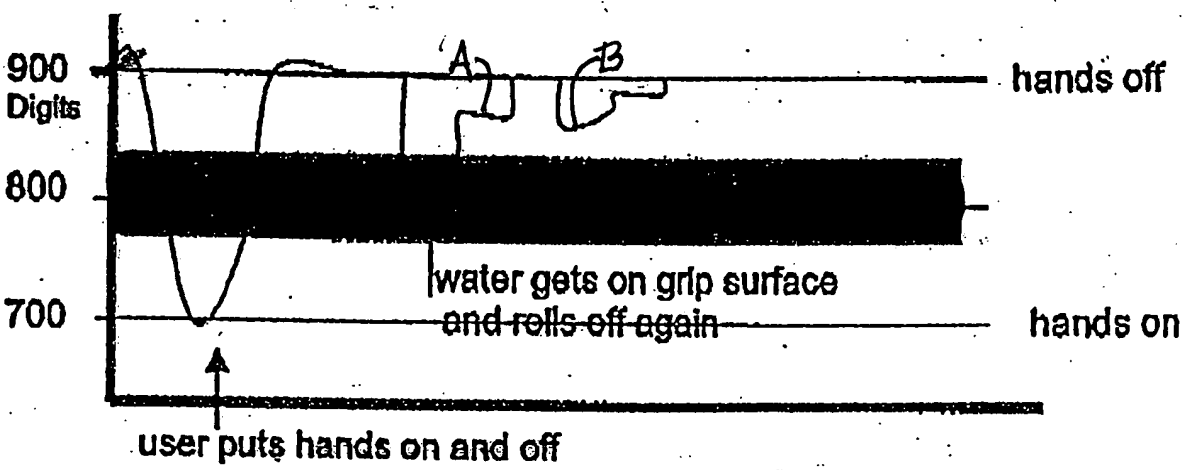

Fig.7